

1 WHAT IS CLAIMED AND DESIRED TO BE SECURED  
2 BY LETTERS PATENT OF THE UNITED STATES IS:

3  
4 1. An apparatus for parallel readout of patterns stored as  
5 data disk tracks on an optical disk, comprising:

6 means for simultaneously illuminating patterns  
7 stored in each of the disk super tracks on the optical disk  
8 with external data encoded in a light beam producing a  
9 reflection beam encoded with data products of the external  
10 data and the patterns; and

11 means for receiving and summing the data products  
12 encoded in the reflection beam for each disk track.

13 2. A data readout apparatus, comprising:

14 a laser illuminating device illuminating data bits  
15 of tracks of an optical disk with an input data modulated  
16 beam; and

17 an accumulator accumulating, in correspondence to  
18 the tracks, a beam reflected from the optical disk.

19 3. An apparatus for parallel readout of patterns stored as  
20 data in a plurality of disk tracks on an optical disk, said  
21 apparatus comprising:

1           a weight and modulated input data beam, encoded with  
2           external data and having a trapezoidal shape, and projected  
3           onto the optical disk as the optical disk rotates producing a  
4           reflection beam encoded with data products of the patterns and  
5           the external data; and

6           a receiving device, which receives the data products  
7           and sums the data products encoded in the reflection beam for  
8           each disk track.

9           4.   The apparatus of Claim 3 further including:

10           a measuring device, coupled to said receiving  
11           device, for measuring the accumulated current associated with  
12           each pattern; and

13           a computing device, coupled to said measuring  
14           device, for determining which pattern has the highest  
15           correlation with external data.

16           5.   The apparatus of Claim 3 further including:

17           a sign beam encoded with sign bits associated with  
18           the components of the external data which is projected onto  
19           the rotating optical disk to produce a sign reflected beam.

1        6.    An apparatus for parallel readout of patterns with  
2        external data stored as data in disk tracks on an optical  
3        disk, comprising:  
4                a laser beam generator generating a laser beam  
5        having an intensity;  
6                a first modulator for modulating the intensity of  
7        the laser beam to produce a weight modulated laser beam;  
8                a first lens for focusing the weight modulated laser  
9        beam;  
10               a second modulator responsive to the weight  
11        modulated laser beam from the first lens and to the external  
12        data for modulating the weight modulated laser beam as a  
13        function of the external data;  
14               a second lens for projecting the weighted and  
15        external data modulated laser beam as a trapezoidal shaped  
16        beam onto the optical disk, simultaneously producing data  
17        products of components of the patterns and the external data  
18        encoded in a reflected beam; and  
19               a receiver array for detecting and summing the data  
20        products encoded in the reflected beam for each disk super  
21        track.

22       7.    The apparatus of Claim 6 further including:

1           a measuring device, coupled to said receiving  
2 device, for measuring the accumulated current associated with  
3 each pattern; and

4           a computing device, coupled to said measuring  
5 device, for determining which pattern has the highest  
6 correlation with external data.

7       8.   The apparatus of Claim 6 further including:

8           a third lens for focusing the reflected beam encoded  
9 with the data products onto said receiver array.

10       9.   The apparatus of Claim 6 wherein said receiver array  
11 comprises:

12           a photodetector array for receiving the data  
13 products encoded in the reflected beam and producing charges  
14 based on the reflection beam;

15           accumulating devices coupled to said photodetector  
16 array for summing and storing the charge for each track; and

17           keeping track of whether the charge corresponds to  
18 positive or negative data.

19       10.   The apparatus of Claim 6 wherein said patterns are vector  
20 components and said external data are vector components.

- 1        11. A method for parallel readout of patterns stored as data  
2        in disk tracks on an optical disk, said method comprising the  
3        steps:
- 4                simultaneously multiplying patterns stored in each  
5        of the disk super tracks on the optical disk with external  
6        data encoded in a light beam to produce a reflected beam  
7        encoded with data products;
- 8                detecting the data products encoded in the reflected  
9        beam for each disk track; and
- 10               summing the data products received from each disk  
11        track.
- 12        12. The method of Claim 11 further including the step of  
13               calculating which pattern has the highest  
14        correlation with the external data.
- 15        13. A method of correlating data, said method comprising the  
16        steps of:
- 17                modulating a beam with input data;
- 18                reflecting the beam off of multiplied bits of an  
19        optical disk; and
- 20                accumulating the beam reflected from the disk as the  
21        disk rotates.

- 1      14. A method for parallel readout of patterns stored as data  
2      in disk tracks on an optical disk, said method comprising the  
3      steps of:
- 4              generating a laser beam having an intensity;  
5              modulating the intensity of the laser beam with  
6      weight to produce a weight modulated laser beam;  
7              modulating the weight modulated laser beam with  
8      external data to produce a weight and external data modulated  
9      laser beam;
- 10             shaping the weight and external data modulated laser  
11      beam to form a trapezoidal beam;
- 12             projecting the trapezoidal beam onto the optical  
13      disk, which is rotating, produces data products of the  
14      patterns and the external data encoded in a reflected beam;
- 15             detecting the data products encoded in the reflected  
16      beam for each disk track; and
- 17             accumulating the data products for each disk track.
- 18      15. The method of Claim 14 further including the step of:
- 19             calculating which pattern has the highest  
20      correlation with the external data.

1     16. An apparatus for parallel readout of patterns stored as  
2     data on an optical disk, said apparatus comprising:

3             a radial modulated input data beam, encoded with  
4     external data, and projected onto the optical disk as the  
5     optical disk rotates producing a reflected beam encoded with  
6     data products of the patterns and the external data; and

7             a receiving device receiving the reflected beam  
8     encoded with the data products.

9     17. An apparatus for parallel readout and correlation of  
10    patterns stored as data on an optical disk having a  
11    supertrack, said apparatus comprising:

12            a laser beam generator for generating a laser beam;  
13            a first lens for focusing the laser beam;  
14            a modulator responsive to the laser beam from the  
15    first lens and to the external data for modulating the laser  
16    beam as a function of the external data to produce a modulated  
17    input data beam;

18            a second lens for spreading the modulated input data  
19    beam to form a radial beam and projecting the radial beam onto  
20    the supertrack of the optical disk, and producing respective  
21    data products of each pattern and the external data encoded in  
22    a reflected beam; and.

1           a receiving array for detecting respective data  
2 products of each pattern and external data encoded in the  
3 reflected beam and producing respective currents based on the  
4 respective data products.

5       18. The apparatus of Claim 17 further including:

6           a filtering device responsive to the respective  
7 currents from said receiving array for producing real and  
8 imaginary components of the respective currents;

9           a measuring device, coupled to said receiving  
10 device, for measuring the respective currents associated with  
11 each pattern; and

12           a computing device, coupled to said measuring  
13 device, for determining which pattern has the highest  
14 correlation with the external data.

15       19. A method for parallel readout and correlation of patterns  
16 stored as data in supertracks on an optical disk, said method  
17 comprising the steps of:

18           simultaneously multiplying patterns stored in each  
19 of the supertracks on the optical disks with external data  
20 encoded in a light beam to produce a reflected beam encoded  
21 with data products; and



1           detecting the data products encoded in the reflected  
2       beam for each supertrack.

3       20. A method for parallel readout and correlation of patterns  
4       stored as data in supertracks on an optical disk, said method  
5       comprising the steps of:  
6           generating a laser beam;  
7           modulating the laser beam with external data to  
8       produce a modulated input data beam;  
9           shaping the modulated input data beam into a radial  
10      beam;  
11          projecting the radial beam onto the optical disk to  
12      produce data products of the patterns and the external data  
13      encoded in a reflected beam; and  
14          detecting the data products encoded in the reflected  
15      beam for each supertrack.

16      21. The method of Claim 20 further including the steps of:  
17          filtering the DC components from the data products  
18      encoded in the reflected beam;  
19          separating the AC components encoded in the  
20      reflected beam into a real component and an imaginary  
21      component; and

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- 1                   calculating which pattern has the highest
- 2                   correlation with the external data.